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EXAMINER	
YU, MISOOK	

ART UNIT	PAPER NUMBER
1642	

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/017,410	FARNHAM ET AL.	
	Examiner	Art Unit	
	MISOOK YU, Ph.D.	1642	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-15* is/are pending in the application.

4a) Of the above claim(s) *1 and 5-10* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2-4 and 11-15* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *02/21/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of group IV, drawn to nucleic acid encoding SEQ ID NO:4, encompassing claims 2-4, and 11-15 in the reply filed on 09/07/2004 is acknowledged. Applicant's argument that groups III and IV should be examined together is persuasive, therefore groups III, and IV are rejoined. By same reasoning, the restriction between groups I, and II drawn to the murine and human proteins are rejoined as one group, and antibody to SEQ ID NO:2, and 4 are rejoined as one group, and method using the antibody and nucleic acid are also rejoined.

As for the record, the revised restriction is as follows.

I. Claim 1, drawn to SEQ ID NO:2 mouse protein, and SEQ ID NO:4 human protein.

II. Claims 2-4, 11-15 all partially, drawn to polynucleotide encoding SEQ ID NO:2 mouse protein, SEQ ID NO:1, SEQ ID NO:4 human protein, SEQ ID NO:3.

III. Claims 5, 11-15 all partially, drawn to antibody to SEQ ID NO:2 mouse protein, or SEQ ID NO:4 human protein and kit containing the antibody.

IV. Claim 6, drawn to method of identifying modulators of expression of SEQ ID NO:2 mouse protein, and SEQ ID NO:4 human protein.

V. Claim 7-10 all partially, drawn to method of diagnosing a hepatocellular cancer using SEQ ID NO:1 mouse nucleic acid, and SEQ ID NO:3 human nucleic acid classified in class 435, subclass 6.

VI. Claim 7-10 all partially, drawn to method of diagnosing a hepatocellular cancer using antibody to SEQ ID NO:2 protein, or SEQ ID NO:4 protein classified in class 435, subclass 7.23.

Applicant argues that searching of all inventions would not put serious burden on the examiner because all are related. These arguments have been considered but found unpersuasive for the following reasons.

The protein group, i.e. group I, and antibody group III, and nucleic acid group II are different inventions as stated in the previous Office action, and the methods of using the each of the different products i.e., nucleic acids, proteins, and antibodies are also different inventions. The polypeptide group and polynucleotide group are patentably distinct inventions for the following reasons. Polypeptides, which are composed of amino acids, and polynucleotides, which are composed of purine and pyrimidine units, are structurally distinct molecules; any relationship between a polynucleotide and polypeptide is dependent upon the information provided by the nucleic acid sequence open reading frame as it corresponds to the primary amino acid sequence of the encoded polypeptide. In the present claims, a polynucleotide of group does not necessarily encode polypeptides in polypeptide groups. For example, as disclosed in the specification, SEQ ID NO: 4 is 275 amino acids in length, whereas the nucleic acid molecule of claim 11 requires oligonucleotide (which would not encode SEQ ID NO:4). Furthermore, the information provided by the polynucleotide group can be used to make a materially different polypeptide than that of polypeptide group. For example, a nucleic acid which hybridizes to SEQ ID NO:3, even under stringent conditions, encompasses

molecules which contain point mutations, splice sites, frameshift mutations or stop codons which would result in use of a different open reading frame, and thus encode a protein that lacks any significant structure in common with SEQ ID NO. 4. In addition, while a polypeptide of group II can made by methods using some, but not all, of the polynucleotides that fall within the scope of the protein group, it can also be recovered from a natural source using by biochemical means. For instance, the polypeptide can be isolated using affinity chromatography.

Furthermore, searching the inventions of polypeptide group and polynucleotides group together would impose a serious search burden. In the instant case, the search of the polypeptides and the polynucleotides are not coextensive. The inventions of polypeptides and polynucleotide groups have a separate status in the art as shown by their different classifications as stated in the previous Office action. In cases such as this one where descriptive sequence information is provided, the sequences are searched in appropriate databases. There is search burden also in the non-patent literature. Prior to the concomitant isolation and expression of the sequence of interest there may be journal articles devoted solely to polypeptides which would not have described the polynucleotide. Similarly, there may have been "classical" genetics papers which had no knowledge of the polypeptide but spoke to the gene. Searching, therefore is not coextensive. In addition, the polypeptide claims include polypeptides having 70% identity to the sequence identified. This search requires an extensive analysis of the art retrieved in a sequence search and will require an in-depth analysis of technical literature. The scope of polynucleotides as claimed extend beyond the

polynucleotide that encodes the claimed polypeptides as explained above; furthermore, a search of the nucleic acid molecules of claim 1(b) would require an oligonucleotide search, which is not likely to result in relevant art with respect to the polypeptide of group II. As such, it would be burdensome to search the inventions of groups I and II together. The polypeptide and the antibody groups are also patentably distinct for the following reasons:

While the inventions of both are polypeptides, in this instance the polypeptide of group II is a single chain molecule, whereas antibodies including IgG which comprises 2 heavy and 2 light chains containing constant and variable regions, and including framework regions which act as a scaffold for the 6 complementarity determining regions (CDRs) that function to bind an epitope. Thus the polypeptide and the antibody are structurally distinct molecules; any relationship between a polypeptide and an antibody is dependent upon the correlation between the scope of the polypeptides that the antibody binds and the scope of the antibodies that would be generated upon immunization with the polypeptide. In this case, the polypeptide is a large molecule which contains potentially hundreds of regions to which an antibody may bind, whereas the antibody is defined in terms of its binding specificity to a small structure within SEQ ID NO: 4, or 2. Furthermore, searching the inventions of polypeptides groups and antibodies group would impose a serious search burden. The inventions have a separate status in the art as shown by their different classifications. A polypeptide and an antibody which binds to the polypeptide require different searches. An amino acid sequence search of the full-length protein is necessary for a determination of novelty

and unobviousness of the protein. However, such a search is not required to identify the antibodies. Furthermore, antibodies which bind to an epitope of a polypeptide of may be known even if a polypeptide is novel. In addition, the technical literature search for the polypeptide the antibody are not coextensive, e.g., antibodies may be characterized in the technical literature prior to discovery of or sequence of their binding target.

Each method group uses a structurally and functionally divergent material. Moreover, the methodology and materials necessary for diagnosis of the HCC differ significantly for each of the materials. For diagnosis using the polynucleotide, hybridization may be used. For diagnosis using the antibody, quantitation of labeled antibody may be used. Therefore, each method is divergent in materials and steps. As for argument with a product, and method of using a product, the examiner has required restriction between product and process claims. Where applicant elects claims directed to the product, and a product claim is subsequently found allowable, withdrawn process claims that depend from or otherwise include all the limitations of the allowable product claim will be rejoined in accordance with the provisions of MPEP § 821.04. **Process claims that depend from or otherwise include all the limitations of the patentable product** will be entered as a matter of right if the amendment is presented prior to final rejection or allowance, whichever is earlier. Amendments submitted after final rejection are governed by 37 CFR 1.116; amendments submitted after allowance are governed by 37 CFR 1.312. In the event of rejoinder, the requirement for restriction between the product claims and the rejoined process claims will be withdrawn, and the

rejoined process claims will be fully examined for patentability in accordance with 37 CFR 1.104. Thus, to be allowable, the rejoined claims must meet all criteria for patentability including the requirements of 35 U.S.C. 101, 102, 103, and 112. Until an elected product claim is found allowable, an otherwise proper restriction requirement between product claims and process claims may be maintained. Withdrawn process claims that are not commensurate in scope with an allowed product claim will not be rejoined. See "Guidance on Treatment of Product and Process Claims in light of *In re Ochiai, In re Brouwer* and 35 U.S.C. § 103(b)," 1184 O.G. 86 (March 26, 1996). Additionally, in order to retain the right to rejoinder in accordance with the above policy, Applicant is advised that the process claims should be amended during prosecution either to maintain dependency on the product claims or to otherwise include the limitations of the product claims. **Failure to do so may result in a loss of the right to rejoinder.** Further, note that the prohibition against double patenting rejections of 35 U.S.C. 121 does not apply where the restriction requirement is withdrawn by the examiner before the patent issues. See MPEP § 804.01.

The requirement is still deemed proper and is therefore made FINAL.

Claims 1-15 are pending. Claims 1, and 6-10 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention.

Claims 2-4, and 11-15 are examined on merits as they are drawn to a nucleic acid.

Claim Objections

Claims 11-14 are objected to because of the following informalities: the claims are drawn to multiple inventions. The claims are not amended to reflect the election. Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 2 is rejected under 35 USC 101 because the claimed invention is directed to non-statutory subject matter.

Claim 2, as written, does not sufficiently distinguish over nucleic acids as they exist naturally because the claims do not particularly point out any non-naturally occurring differences between the claimed products and the naturally occurring products. In the absence of the hand of man, the naturally occurring products are considered non-statutory subject matter. *See Diamond v. Chakrabarty*, 447 U.S. 303, 206 USPQ 193 (1980). The claims should be amended to indicate the hand of the inventor, e.g., by insertion of "Isolated" or "Purified". See MPEP 2105.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 2-4, and 12-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 2, and 15 recite "under moderately stringent hybridization conditions" but it is not clear what the metes and bounds are. The specification at paragraph [0030] gives an exemplary moderately stringent hybridization conditions but the specification doe not set the metes and bounds of the claimed scope by the limitation. Since the structure of nucleic acids that would bind to instant SEQ ID NO:1, and 3 would be dependent upon a hybridization condition, the claims are indefinite.

Claims 12, and 13 recite "a predetermined level of expression" but it is not clear what the metes and bounds are. It is not clear whether "a predetermined level of expression" is a binary status of either being expressed in the positive control or not expressed or whether it is quantitative, for example, expression above 5 in the scale 1-10.

Claim 14 depends on claim 11, which is drawn to kit comprising an entity that binds to nucleic acid encoding the two proteins (i.e. SEQ ID NO:2, and 4) recited in the instant claim 14, or comprising an entity that binds to the protein. The base claim does not say the kit comprises the proteins. If applicant likes to claim the protein in the kit in addition to the entity either binds to the nucleic acid or the polypeptide, than adding "further" in front of "comprising" in claim 14 would obviate this rejection. If claim 14 further limits the nature of nucleic acid that claimed oligonucleotide or polynucleotide binds to, claim 14 should be drafted accordingly.

Claims 2-4, and 11-13, and 15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the **written description** requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claims 2-4, 11-13 are interpreted as drawn to a genus of nucleic acid molecules with various degrees of variations i.e. 80 % identity to SEQ ID NO:1, or 3, and hybridizes under moderately stringent hybridization conditions to the nucleic acid molecules with 80 % identity to SEQ ID NO:1. (claims 2-4), hybridizes to a nucleic acid that encodes polypeptide of SEQ ID NO:2, and 4 (claims 11-13).

The applicable standard for the written description requirement can be found: MPEP 2163; University of California v. Eli Lilly, 43 USPQ2d 1398 at 1407; PTO Written Description Guidelines; Enzo Biochem Inc. v. Gen-Prove Inc., 63 USPQ2d 1609; Vas-Cath Inc. v. Mahurkar, 19USPQ2d 1111; and University of Rochester v. G.D. Searle & Co., 69 USPQ2d 1886 (CA FC 2004).

To provide adequate written description and evidence of possession of a claimed genus, the specification must provide sufficient distinguishing identifying characteristics of the genus. The factors to be considered include disclosure of complete or partial structure, physical and/or chemical properties, functional characteristics, structure/function correlation, methods of making the claimed product, or any combination thereof. In this case, the only factor present in the claims is a partial

structure in the form of sequence identity or hybridization under undefined condition. Accordingly, in the absence of sufficient recitation of distinguishing identifying characteristics, the specification does not provide adequate written description of the claimed genus.

Vas-Cath Inc. v. Mahurkar, 19USPQ2d 1111, clearly states "applicant must convey with reasonable clarity to those skilled in the art that, as of the filing date sought, he or she was in possession of the invention. The invention is, for purposes of the 'written description' inquiry, *whatever is now claimed.*" (See page 1117.) The specification does not "clearly allow persons of ordinary skill in the art to recognize that [he or she] invented what is claimed." (See Vas-Cath at page 1116). As discussed above, the skilled artisan cannot envision the detailed chemical structure of the encompassed genus of nucleic acid molecules, given that the specification has only described SEQ ID NO: 1 and 3. Therefore, only isolated nucleic acid comprising SEQ ID NO:1 and 3, but not the full breadth of the claim meets the written description provision of 35 U.S.C. §112, first paragraph.

Claims 2-4, and 11-13, and 15 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for SEQ ID NO:1, 3, and nucleic acids encoding SEQ ID NO: 2, and 4, does not reasonably provide enablement for any other nucleic acid molecules. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims.

The factors considered when determining if the disclosure satisfies the enablement requirement and whether any necessary experimentation is "undue" include, but are not limited to: 1) nature of the invention, 2) state of the prior art, 3) relative skill of those in the art, 4) level of predictability in the art, 5) existence of working examples, 6) breadth of claims, 7) amount of direction or guidance by the inventor, and 8) quantity of experimentation needed to make or use the invention. *In re Wands*, 858 F.2d 731, 737, 8 USPQ2d 1400, 1404 (Fed. Cir. 1988).

The nature of the invention is a genus of nucleic acid molecule with certain degree of similarity to SEQ ID NO: 1 or 3. The specification teaches at pages 8, and 9 teaches that SEQ ID NO:1 is overexpressed in mouse HCC, the nucleic acid corresponding to the human homolog is also overexpressed in human HCC (hepatocellular carcinoma). The specification does not teach which other nucleic acid molecules other than SEQ ID NO:1, and 3 are expressed in HCC. The specification does not teach how to use a nucleic acid that is not overexpressed in HCC. The relative level of skill in making nucleic acids molecules that are overexpressed in HCC is not high. Graveel et al., (IDS, 2001, Oncogene, vol. 20, pages 2704-2712) teach the current state of how one of skill isolate a nucleic acid that is overexpressed in HCC. It requires screening a large quantity of clinical samples, namely liver tissue from patients with HCC, followed by isolating mRNA species that are differentially and preferentially expressed in HCC. In other words, one skilled in art has to determine what other mRNA species are differentially or preferentially expressed in HCC. Which other similar sequences could be used as HCC or cancer marker is still unpredictable until said

sequences are experimentally determined by screening a large quantity of appropriate clinical samples. The breadth of the claim is broad including unknown species. The level of predictability which nucleic acid molecule will be expressed in HCC or is low. The amount of direction or guidance by the inventor how to use the full scope of claimed nucleic acid molecule with the recited structural element coupled with the recited function is limited. There are no working examples or guidance or direction to allow the person of ordinary skill in the art to make species in a manner commensurate in scope with the claims. The quantity of experimentation needed to make the invention is large. In order to make the full scope of the invention, one skilled in the art has to screen a large quantity of clinical samples from liver or pancreatic tissue of patients having HCC, followed by sequence the nucleic acid composition.

In summary, using the claimed nucleic acid that is 80 % identical and hybridized but is not expressed in HCC requires undue experimentation because the specification does not teach how to use the vast number of claimed nucleic acids other than SEQ ID NO:1 or 3. It is noted that law requires that the disclosure of an application shall inform those skilled in the art how to make the alleged discovery, not how to screen it for themselves.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 2-4, 11, 13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Bonaldo et al., (1996, Genome Research, vol. 6, pages 791-806).

The claims are interpreted as drawn to an isolated nucleic acid, and a kit comprising said nucleic acid that hybridizes under moderately stringent conditions to nucleic acid having at least about 80% nucleotide sequence identity to SEQ ID NO:1, or to SEQ ID NO:1 (note the base claims 2, and 11, the dependent claim 15 are written in Markush format), wherein said nucleic acid is downstream from a heterologous promoter (claim 3), transfected into a host cell (claim 4), wherein the kit contains positive control and negative control (claim 11), more specifically, said negative control being non-tumor liver cells (claim 13).

Bonaldo et al., at page 801, right column under the heading "Construction of Directionally Cloned cDNA Libraries" teach "*NotI*-tag-$(dT)_{18}$ and other poly(dT) primers for priming the first strand of cDNA synthesis. Since instantly claimed nucleic acid is drawn to a nucleic acid that hybridizes under moderately stringent conditions to nucleic acid having at least about 80% nucleotide sequence identity to SEQ ID NO:1, or to SEQ ID NO:1 (note the base claims 2, and 11, the dependent claim 15 are written in Markush format), the claimed nucleic acid reads on the poly(dT) primers of the art, given that instant SEQ ID NO:1 has polyA tails (about 20 A's) at the 3' untranslated region. Further, Bonaldo et al., teach at page 802, Figure 6 that pT7T3 vector that the first strand of cDNA is being inserted to, wherein the pT7T3 vector has a heterologous promoter (i.e. T7 or T3 promoter in relationship to human cDNA made from priming the total cellular RNA from the various sources for the subtractive cDNA library

construction. Since the subtractive contraction requires two sources of controls (i.e. positive and negative for the expressions), the claimed positive and negative controls read on the tissues samples of Bonaldo et al. As for non-tumor live tumor cells and an extract of non-tumor cells, the art teach extracts from fetal spleen or fetal liver. Note the abstract.

Thus, Bonaldo et al., anticipate claims 2-4, 11, 13, and 15.

Claims 2, 11-13, and 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Wu et al., (April 12, 1996, Biochim Biophys Acta. Vol. 1315, issue no. 3, pages 169-75).

The claims are interpreted as drawn to an isolated nucleic acid, and a kit comprising said nucleic acid that hybridizes under moderately stringent conditions to nucleic acid having at least about 80% nucleotide sequence identity to SEQ ID NO:1, or to SEQ ID NO:1 (note the base claims 2, and 11, the dependent claim 15 are written in Markush format), wherein said kit contains positive control and negative control (claim 11), more specifically said positive control being liver tumor cells (claim 12), said negative control being non-tumor liver cells (claim 13).

Wu et al., at page170 left column teach "oligo(dT) cellulose (Boehringer, Almere, The Netherlands)" that is used to isolate poly(A) RNA, and "Oligo(dT)-Not1 (Invitrogen, San Diego, CA)" that is used to prime the first strand of cDNA synthesis. Since instantly claimed nucleic acid is drawn to a nucleic acid that hybridizes under moderately stringent conditions to nucleic acid having at least about 80% nucleotide sequence

identity to SEQ ID NO:1, or to SEQ ID NO:1 (note the base claims 2, and 11, the dependent claim 15 are written in Markush format), the claimed nucleic acid reads on either the oligo(dT) cellulose or "Oligo(dT)-Not1 of the art given that instant SEQ ID NO:1 has polyA tails (about 20 A's) at the 3' untranslated region. Further, Wu et al., teach kit containing positive control and negative control, more specifically said positive control being liver tumor cells, said negative control being non-tumor liver cells. Note Fig. 1, and Materials and methods at page 170.

Thus, Wu et al., anticipates claims 2, 11-13, and 15.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MISOOK YU, Ph.D. whose telephone number is 571-272-0839. The examiner can normally be reached on 8 A.M. to 5:30 P.M., every other Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jeffrey C Siew can be reached on 571-272-0787. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

MISOOK YU, Ph.D.
Examiner
Art Unit 1642